FAAD-F-1369-3
June 5, 2000
Superceding
FAAD-F-1369-1&2
April 1, 1999

DEPARTMENT OF TRANSPORTATION

FEDERAL AVIATION ADMINISTRATION

FAA LOGISTICS CENTER ACQUISITION SPECIFICATION

THERMAL FLIGHT STRIPS

Manufacturing and Packaging Specifications

Thermal Flight Enroute Strips
NSN: 7530-01-435-1872
Thermal Flight Tower Strips
NSN: 7530-01-453-5094
Thermal Tower ½ Flight Strips
NSN: 7530-01-468-4688

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1. SCOPE.

1.1 General. This specification defines the material, perforations, cutting and packaging of thermal flight strips used by the Federal Aviation Administration for the control of air traffic. The contractor shall provide thermal flight strips manufactured, packaged, and labeled in strict accordance with this specification.

Thermal flight strips must have consistent dimensions and thermal top coat in order to be functional in equipment used to control air traffic. Noncompliance with any specified dimension constitutes sufficient cause for rejection of thermal flight strips.

2. APPLICABLE DOCUMENTS.

2.1 Applicable Documents. The following documents form a part of this specification. Unless otherwise indicated, the document issue in effect on the date of issuance of the producing or converting order shall apply. If any conflict exists between referenced standards and this specification, this specification shall take precedence.

2.1.1 Standards: ANSI/ASQC Q9002-1994*, Quality Assurance in Production, Installation and Servicing:(supersedes Q91-1987)

2.1.2 Specifications, Federal:

ASTM-D-5118/5118M, Standard Practice for Fabrication of Fiberboard Shipping Container.

NN-P-71, Pallets, Material Handling, Wood, Stringer Construction, 2-Way and 4-Way (partial).

2.1.3 TAPPI (Technical Association of the Pulp and Paper Industry:

T 410 om-88	Grammage of paper and paper board (Weight per unit area)
T 411 om-84	Thickness (caliper) of paper, paper board and combined board
T 538 om-88	Smoothness of paper and paperboard (Sheffield method)
T 543 om-84	Stiffness of paper (Gurley type stiffness tester)
T 494 om-88	Tensile breaking properties of paper and paper board(using constant rate of elongation apparatus)
T 414 om-88	Internal tearing resistance of paper (Elmendorf type method)
T 530 pm-83	Size test for paper by ink resistance
T 425 om-86	Opacity of paper (15% diffuse illuminant A, 89% reflectance backing and paper backing)
T 452 om-87	Brightness of pulp, paper, and paper board (directional reflectance at 457 nm)

The FAA will require two (2) sheets of non-converted sample material with dimensions of twenty-five (25) inches by twenty-five (25) inches to be tested for the above TAPPI specification.

1.* Quality Systems-Model for Quality Assurance in Production, Installation, and Servicing-for use when conformance to specified requirements is to be assured by the supplier during production, installation, and servicing.

2.1.4. ASTM specification: American Society for Testing and Material:

ASTM Designation F1405-93
Standard test method for determining the Dynamic Thermal response of direct thermal imaging products. (Atlantek method)

3. COMMON SPECIFICATIONS.

3.1 Writing Attributes. All thermal flight strips have a common writing quality requirement. The thermal flight strips shall be suitable for use with, but not limited to, the common pencil, ball point pen, pen and ink.

3.2 Paper. All thermal flight strips shall be produced from paper/stock conforming to the following specifications.

3.2.1 Paper Product Specification:
Material: Material is made of a thermal paper, top coated, non-glare, non-reflective, and uniform smoothness. The tint (dye) must be under the top coat of the thermal paper. Stated another way, the thermal strip shall not have any other chemical (ink) over or added to the top coat. The splicing of strips, by adhesive tape or any other method is not permissible.

3.2.2 Optional Designs.
The specified performance, severe environmental requirements included, and physical and electrical compatibility with existing equipment are necessary. Optional designs will be accepted for consideration and, subject to the approval of the procuring authority, may be accepted for a trial and developmental effort to be performed by the offering contractor and the FAA in concert.

3.2.3 Color.
Face: Tinted green thermal active coating under the top coating. The FAA will provide the sample color of thermal strips.

Back: White

3.2.4 Directional Arrow: The first strip or top strip is defined as the first strip in a stack, where the black mark is closest to the leading edge.

3.2.5 Sizes and Dimensions: Size of each thermal flight strip is specified in Drawing DE-A-3379-1, -2 and -3. (Drawings attached)

3.2.6 Registration Mark Color: Black, PMS(Pantone Matching System) paton black C. black mark is positioned on the back of thermal strip at 1.1614 inches +/- 0.02 inches from the perforation.

Definition of Register: Register is the relative location of any part or portion of the finished product with respect to the specified perfect location. Register of any part or portion to any other part or portion is the relative location with respect to each other.

3.3 Fold Perforation: The perforation shall be made from the face of the flight strips. The perforation must end at a distance of .03 inches or .75 mili-meter from each side. (see drawing # DE-A-3379-1, -2 and -3)

Configuration: 8TPI(teeth per inch)/.039 inch tie
Cut/tie Ratio: 2.2 : 1

3.4 Paper Performance Specifications:

	Target	Range
Basis weight: (lbs/17X22X500 ream) g/m² TAPPI 410	173	158-188
Caliper(thickness): Mils TAPPI 411	7.2	6.9-7.5
Length : Inch	8.0	+/-.005
*Width : Inch	1.317	+/-.005
**Width : Inch	1.000	+/-.005
***Width: Inch	1.000	+/-.005
Paper fanfold per stack : Strip	1,000	950-1,050
*Paper fanfold per box : Strip	10,000	9,950-10,100
**Paper fanfold per box : Strip	13,000	12,950-13,050
***Paper fanfold per box: Strip(DE-A-3379-3)	13,000	12,950-13,050
Smoothness (Sheffield Units, Coated side) TAPPI 538	10	0-30

Stiffness (Gurley units) TAPPI 543
MD(Machine Direction) 1,360(Typical)

CD(Cross Direction) 611 (Typical)
Tensile(lbs force) TAPPI 494
MD 63.2(Typical)
CD 38.1(Typical)

* applies to NSN 7530-01-435-1872
** applies to NSN 7530-01-453-5094
*** applies to NSN 7530-01-468-4688

Tear (grams force)	TAPPI 414	
MD		113 (Typical)
CD		110 (Typical)
Absorption rate(second)	Face: TAPPI 530	2005.3(Typ.)
	Back:	390.4(Typ.)
Opacity (Ratio)	TAPPI 425	98.4 (Typ.)
Light reflection (Ratio)	TAPPI 452	82 (Typ.)
Dust	TAPPI 437	SEE CHART

Static Thermal Response Temperature:

0.2 ODU	170 degree F	+/- 40 F or	77 degree C	+/-5 C
1.0 ODU	180 degree F	+/- 40 F or	82 degree C	+/-5 C

Maximum density	1.33 odu	1.3-1.4
Temp. required	230 degree F +/- 40 F or	110 degree C +/-5 C

Dynamic Thermal Response Temperature:
(Atlantek 300 - 12 volts: millijoules per sq. mm.)

0.2 ODU	13.37
1.0 ODU	21.55
Maximum density	1.40 odu
Energy required	37.69

3.5 Application Information:
The product will have a shelf life of 3 years under the following storage condition: Product must be kept dry and out of direct sunlight. The storage temperature is at an optimum condition of 80 degree Fahrenheit plus or minus 20 degrees Fahrenheit, and the humidity range of 45% to 65%.

Higher storage temperatures and/or relative humidity will affect product performance. The product can be exposed to temperature up to 125 degree Fahrenheit for short period of time without affecting product performance.

3.6 Approval for Production. Where changes are made to the specifications or drawings pursuant to the **Changes** clause of the contract the FAA will require a pre-production conference conducted by the Contracting Officer(CO), attended by the FAA, at the production plant prior to start of production. The FAA will require pre-production samples be tested and documentation presented by the contractor prior to entering into production. Pre-production samples will be tested to demonstrate conformance to this specification. Documentation of test results will be provided to the CO.

FAA will provide the contractor a thermal printer and instructions for running test patterns to verify the thermal paper meets the performance requirements as defined in this specification. The printer shall be returned to the FAA upon completion of the contract.

4. QUALITY ASSURANCE.

4.1 Method of Inspection. Critical application of thermal flight strips and the necessity of their functioning in other equipment dictate that all physical attributes specified herein for the manufacturing, packaging, and transportation of thermal flight strips be subject to inspection. Acceptance inspection of all flight strips shall be done in accordance with ANSI/ASQC Z1.4-1993.

In brief, ANSI/ASQC Z1.4-1993 is an established method for sampling inspection by attributes of incoming lots of material. Lot size determines the sample size to be selected from the lot and inspected. Results of the sample inspection determine if the lot is accepted or rejected. The acceptable quality level (AQL) will be (1) percent defective as defined by ANSI/ASQC Z1.4-1993 for all flight strips.(Reference attached TDR data sheet) The FAA, at their sole discretion, may elect to accept portions of lots found defective.

4.2 Location of Inspection. Final acceptance of all thermal flight strips is at destination with acceptance inspection as specified by the contract. The FAA reserves the right to make in-plant inspection during the contract period as designated by the contracting officer.

A pre-production conference at the contractor's plant is required for the first two production runs ordered pursuant to terms of the contract. FAA representatives and contractor personnel shall attend with the conference scheduled no more than two (2) calendar days prior to production. The FAA shall be notified a minimum of seven (7) work days in advance of the meeting date.

When in-plant inspection is requested by the FAA, it shall always follow the pre-production conference. The CO representative at the pre-production conference shall define the inspection authority delegated to the FAA at the conference. The CO representative's presence during all or part of the inspection process is at the sole discretion of the CO representative.

The FAA in-plant inspection process shall follow all requirements of section 4, Quality Assurance of Specification FAAD-F-1369-3. The contractor shall furnish the FAA inspectors floor space, material handling assistance and complete product for inspection.

The FAA recognizes that lot inspection can be accomplished by random sampling of the continuous process and will have adequate personnel to perform on that basis if a method is agreed to by the FAA, the CO, and the contractor. When in-plant inspection is performed final destination acceptance of the material inspected in-plant will be limited to verification of quantity and physical integrity of the material. All other material produced under the contract shall be destination inspected, as defined in this specification.

4.3 Contractor Quality Control Program Requirements. The contractor shall provide and maintain a quality control program which fulfills the requirements of this specification and compliance with the specification of ANSI/ASQC Q9002/1994, Inspection Systems Requirements. The contractor's quality control program shall be a scheduled and controlled plan of events integrating all necessary inspections and tests required to substantiate product quality during purchasing, subcontracting, manufacturing, fabrication, processes, assembly, packaging, and shipping. The contractor shall perform, or have performed, all inspections and tests required to substantiate product configuration and conformance to drawings and specifications.

4.4 Attributes Inspected. As stated in section 1.1, all defined attributes are subject to inspection and are in themselves, cause for rejection if out of tolerance in quantities defined by ANSI/ASQC Z1.4/1993.

A list of these attributes will include: Critical Defects: Thermal top coat; paper thickness; perforation strength; black register mark, basic size dimensions, thermal coat, paper color, single stack fanfold contiguous of 1000(+/-0.5%) strips, and directional arrow on first strip of each stack. Major Defects: labeling, packaging, and label code of box.

4.4.1 Critical Defects: A part whose failure to meet specified requirements results in the failure of the product to serve its intended purpose.

4.4.2 Major Defects: A defect which could result in failure or significantly reduce the usability of a unit for its intended purpose.

5. PACKAGING REQUIREMENTS.

5.1 Materials. The contractor shall furnish all labels, boxes, cartons, pallets, and other miscellaneous items required to package flight strips as specified herein.

5.2 Boxes. **Box** is defined as the smallest container/package of flight strips. A box of thermal paper flight strips shall contain 10 and/or 13 individual stacks of 1,000 contiguous fanfold strips (folded singularly). Each stack of contiguous strips shall be held together by a single strip of heat sealable plastic banding. Banding shall be removable without using a device. A directional arrow, showing the correct way of installing paper into paper holder, must be shown on the top of each stack.

5.2.1 Requirements. Boxes shall be single-wall domestic class corrugated fiberboard as defined by Federal Specification ASTM-D-5118/5118M. Do **Not** use staples.

Grade size - 32 pounds/inch carton (ETC) with reinforced tape on all outside closures. Do **Not** use staples.

5.3 Pallets. Pallets shall not exceed forty-three (43) inches by fifty-two (52) inches, Type III pallets as defined by Federal Specification NN-P-71. Type III pallets are four-way (partial), flush, assembled, non-reversible made of untreated group II woods (medium density softwood) or better.

5.4 Palletized Size Limits. No portion or part of the contents of the pallet shall overhang or project beyond any edge of the pallet. The **overall height** of pallet and contents shall **not exceed fifty-four (54) inches.**

5.5 Palletizing- General. All palletized material produced under this specification shall be centered upon the pallet and tightly stretch or shrink-wrapped. The wrapping shall be multiple layer as required to maintain load centering when the pallet is subjected to a non-elastic stop (collision with a stationary object), while moving at two (2) miles per hour. Rough handling by a forklift truck is a comparable test.
All pallets for an order/contract shall contain the same number of boxes excepting only the last pallet load required to complete the order. An identifying number shall be stamped or legibly hand written on all boxes. This number will be used by the supplier to identify the manufacturing date of the finished product and allow the supplier to trace the finished product back to the raw material used. One such identifying number is, 123456.

Where positions 1 and 2 represent a two-digit month and position 3 and 4 represent the two-digit day. Position 5 represents a time of the day and position 6 identifies the raw material.

In addition to the label, each production order shall be labeled with a different color label using the following sequence of colors: 1. Yellow, 2. Red, 3. Green, 4. Pink, 5. Blue, 6.Orange, 7. White.

5.6 Boxes Label. Boxes shall also be labeled as followed:

TITLE:	PAPER, TABULATING MACHINE, CONTINUOUS FLAT
NSN:	7530-01-435-1872 or 7530-01-453-5094 or 7530-01-468-4688
QUANTITY:	10,000-strips or 13,000 strips
PRODUCTION DATE:	mm-dd-yy
EXPIRATION DATE:	mm-dd-yy

5.7 Pallet Labeling. Palletized shipment is required. Any Commercial Order requirement to show addresses and complete address on each box is waived. The name and address of the consignee is required for each wrapped pallet. The consignee (``SHIP TO'') address is shown in 6.2 below. The purpose of the pallet label is to assure delivery to the original consignee. Photocopied pallet labels are acceptable.

6. Delivery.

6.1 Delivery Requirements - All Thermal Flight Strips. Delivery shall be scheduled so that receipt at destination is on or before the date(s) shown on the accompanying producing order. Shipment lot size sufficient to fully load trailers is required.

6.2 Freight Destinations - All Flight Strips.

U.S. Department of Transportation
FAA Monroney Aeronautical Center
Mark For: AML-1000 Receiving Dock
Attn: (Indicate delivery order number)
6500 South MacArthur Blvd.
Oklahoma City, OK 73169

Normal receiving hours at this address are 7:00am to 3:00pm. Freight carriers may call 405-954-5471 to schedule delivery.

6.3 Mailing Address. - Correspondence.

U.S Department of Transportation
FAA Monroney Aeronautical Center
6500 South MacArthur Blvd.
ATTN: AML-5000, Automations Product Shop,
East Entrance, SSC: 697C0642,
Oklahoma City, OK 73169